

Amendments to the claims

The following listing of claims replaces any prior revisions or listing of claims in this application.

1. (Previously Presented) A data stream compression apparatus comprising

a data stream processing element for receiving a first stream of data entities at a first line rate, each data entity including a data packet and a gap, the gap alone or the gap and data packet both including non-unique, invariant content, and responsive to a control signal for generating a second stream of data entities at a second line rate which is less than the first line rate, each second stream data entity including a data packet and a gap,

a control unit for providing said control signal identifying a predetermined portion of non-unique, invariant content of said first stream of data entities, said predetermined portion of non-unique, invariant content being identified using pre-knowledge of the type of said first stream of data entities, and

wherein said data stream processing element in response to said control signal removes said predetermined portion of non-unique, invariant content from a data packet or gap of one or more data entities of said first stream thereby generating said second data stream of data entities at the second line rate.

2. (Original) The data stream compression apparatus of claim 1 wherein the non-unique, invariant content of said first data stream is determined in real-time.

3. (Original) The data stream compression apparatus of claim 1 wherein the non-unique, invariant content includes one or more interpacket characters.

4. (Original) The data stream compression apparatus of claim 1 wherein said first data stream is gigabit Ethernet data stream and the non-unique, invariant content includes one or more PREAMBLE characters.

5. (Original) The data stream compression apparatus of claim 1 wherein said first data stream is gigabit Ethernet data stream and the non-unique, invariant content includes one or more IDLE2 characters.

6. (Original) The data stream compression apparatus of claim 1 wherein said non-unique, invariant content of said first stream of data entities has been predetermined.

7. (Original) The data stream compression apparatus of claim 1 being part of a data communication system including said data stream compression apparatus connected to transmit said second data stream over a communication link to a data stream expansion apparatus, said data stream expansion apparatus comprising

a data stream processing element for receiving said second data stream of data entities from the communication link at a second line rate and responsive to a control signal for generating a first stream of data entities at a first line rate which is greater than the second line rate,

a control unit for providing said control signal identifying a predetermined portion of non-unique, invariant content which is to be added to said second data stream of data entities, and

wherein said data stream processing element in response to said control signal adds said predetermined portion of non-unique, invariant content to said second data stream of data entities thereby generating said first data stream of data entities at the first line rate.

8. (Previously Presented) A data stream expansion apparatus comprising

a data stream processing element for receiving a continuous second data stream of data entities at a second line rate, each data entity including a data packet and a gap, the gap having zero length or including non-unique, invariant content, and

responsive to a control signal for generating a continuous first stream of data entities at a first line rate which is greater than the second line rate,

a control unit for providing said control signal identifying a predetermined portion of non-unique, invariant content which is to be added to said second data stream of data entities,

said control unit using pre-knowledge to identify said predetermined portion of non-unique, invariant content which is to be added to said second data stream of data entities, and

wherein said data stream processing element in response to said control signal adds said predetermined portion of non-unique, invariant content to a data packet or gap of one or more data entities of said second data stream thereby generating said first data stream of data entities at the first line rate.

9. (Currently Amended) The data stream ~~compression~~ expansion apparatus of claim 8 wherein the non-unique, invariant content of said first data stream is determined in real-time.

10. (Currently Amended) The data stream ~~compression~~ expansion apparatus of claim 8 wherein the non-unique, invariant content includes one or more interpacket characters.

11. (Currently Amended) The data stream ~~compression~~ expansion apparatus of claim 8 wherein said first data stream is gigabit Ethernet data stream and the non-unique, invariant content includes one or more PREAMBLE characters.

12. (Currently Amended) The data stream ~~compression~~ expansion apparatus of claim 8 wherein said first data stream is gigabit Ethernet data stream and the non-unique, invariant content includes one or more IDLE2 characters.

13. (Currently Amended) The data stream ~~compression~~ expansion apparatus of claim 8 wherein said non-unique, invariant content of said first stream of data entities has been predetermined.

14. (Previously Presented) A data compression multiplexer apparatus comprising

(1) a plurality of data stream compression apparatuses, each comprising

a data stream processing element for receiving a first data stream of data entities at a first line rate, each data entity including a data packet and a gap, the gap alone or the gap and data packet both including non-unique, invariant content, and responsive to a control signal

for generating a second stream of data entities at a second line rate which is less than the first line rate, each second stream data entity including a data packet and a gap,

a control unit for providing said control signal identifying a predetermined portion of non-unique, invariant content of said first stream of data entities, said predetermined portion of non-unique, invariant content being identified using pre-knowledge of the type of said first stream of data entities, and

wherein said data stream processing element in response to said control signal removes said predetermined portion of non-unique, invariant content from a data packet or gap of one or more data entities of said first stream thereby generating said second data stream of data entities at the second line rate, and

(2) a data stream multiplexer for multiplexing said plurality of second data streams to generate a multiplexed data stream.

15. (Currently Amended) A data compression multiplexer apparatus comprising

(1) a plurality of data stream compression apparatuses, each comprising

a data stream processing element for receiving a first data stream of data entities at a first line rate, each data entity including a data packet and a gap, and responsive to a control signal for generating a second stream of data entities at a second line rate which is less than the first line rate,

a control unit for providing said control signal identifying a predetermined portion of non-unique, invariant content of said first stream of data entities, said control unit using pre-knowledge to identify said predetermined portion of non-unique, invariant content, and

wherein said data stream processing element in response to said control signal removes said predetermined portion of non-unique, invariant content of said first stream of data entities thereby generating said second data stream of data entities at the second line rate, and

(2) a data stream multiplexer for multiplexing said plurality of second data streams to generate a multiplexed data stream, the data compression multiplexer apparatus further comprising

eight data stream compression apparatuses,

wherein each said first data stream is a gigabit Ethernet data stream at 1.25 Gb/s, and
wherein said multiplexed data stream generated by said data stream multiplexer is less than or equal to the SONET OC-192 line rate.

16. (Original) The data compression multiplexer apparatus of claim 14 being part of a data communication system including said data compression multiplexer apparatus connected to transmit said multiplexed data stream over a communication link to a data expansion demultiplexer apparatus, the data expansion demultiplexer apparatus comprising

- (1) a data stream demultiplexer for demultiplexing a received multiplexed data stream from the communication link into a plurality of second data streams and
- (2) a plurality of data stream expander apparatuses, each for processing one of the plurality of second data streams, each data stream expander apparatus including

a data stream processing element for receiving a second data stream of data entities at a second line rate and responsive to a control signal for generating a first stream of data entities at a first line rate which is greater than the second line rate,

a control unit for providing said control signal identifying a predetermined portion of non-unique, invariant content which is to be added to said second data stream of data entities, and

wherein said data stream processing element in response to said control signal adds said predetermined portion of non-unique, invariant content to said second data stream of data entities thereby generating said first data stream of data entities at the first line rate.

17. (Previously Presented) A data expansion demultiplexer apparatus comprising

- (1) a data stream demultiplexer for demultiplexing a received multiplexed data stream into a plurality of continuous second data streams and
- (2) a plurality of data stream expander apparatuses, each for processing one of the plurality of continuous second data streams, each data stream expander apparatus including

a data stream processing element for receiving a continuous second data stream of data entities at a second line rate, each data entity including a data packet and a gap, the gap having zero length or including non-unique, invariant content, and responsive to a control

signal for generating a continuous first stream of data entities at a first line rate which is greater than the second line rate,

a control unit for providing said control signal identifying a predetermined portion of non-unique, invariant content which is to be added to said continuous second data stream of data entities, said control unit using pre-knowledge to identify said predetermined portion of non-unique, invariant content which is to be added to said continuous second data stream of data entities, and

wherein said data stream processing element in response to said control signal adds said predetermined portion of non-unique, invariant content to a data packet or gap of one or more data entities of said continuous second data stream thereby generating said continuous first data stream of data entities at the first line rate.

18. (Currently Amended) A data expansion demultiplexer apparatus comprising

(1) a data stream demultiplexer for demultiplexing a received multiplexed data stream into a plurality of second data streams and

(2) a plurality of data stream expander apparatuses, each for processing one of the plurality of second data streams, each data stream expander apparatus including

a data stream processing element for receiving a second data stream of data entities at a second line rate and responsive to a control signal for generating a first stream of data entities at a first line rate which is greater than the second line rate,

a control unit for providing said control signal identifying a predetermined portion of non-unique, invariant content which is to be added to said second data stream of data entities, said control unit using pre-knowledge to identify said predetermined portion of non-unique, invariant content, and

wherein said data stream processing element in response to said control signal adds said predetermined portion of non-unique, invariant content to said second data stream of data entities thereby generating said first data stream of data entities at the first line rate the data expansion demultiplexer apparatus further comprising

eight data stream expansion apparatuses,

wherein the data rate of the received multiplexed data stream is less than or equal to the SONET OC-192 line rate, and

wherein at least one of the data stream expansion apparatuses receives a second data stream from the data stream demultiplexer and generates therefrom a gigabit Ethernet data stream at 1.25 Gb/s.

19. (Previously Presented) A method of operating a data stream compression apparatus comprising the steps of:

receiving a first stream of data entities at a first line rate, each data entity including a data packet and a gap, the gap alone or the gap and data packet both including non-unique, invariant content,

identifying a predetermined portion of non-unique, invariant content of said first stream of data entities using pre-knowledge of the type of said first stream of data entities, and

removing said predetermined portion of non-unique, invariant content from a data packet or gap of one or more data entities of said first stream thereby generating said second data stream of data entities at the second line rate, each second stream data entity including a data packet and a gap.

20. (Previously Presented) A method of operating a data stream expansion apparatus comprising the steps of:

receiving a continuous second data stream of data entities at a second line rate, each data entity including a data packet and a gap, the gap having zero length or including non-unique, invariant content,

identifying, using pre-knowledge information, a predetermined portion of non-unique, invariant content which is to be added to said second data stream of data entities, and

adding said predetermined portion of non-unique, invariant content to a data packet or gap of one or more data entities of said second data stream thereby generating a first data stream of data entities at a first line rate which is greater than the second line rate.